

Response of a Fluvial Depositional System to Unequal Compaction of Underlying Peat (Neogene, Most Basin, Czech Republic)

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In coal-bearing basins, compaction of peat can play a significant, but as yet not fully explored, role in the behaviour of depositional systems. The Most Basin in the northwestern part of the Czech Republic, one of several sub-basins of the Ohře Rift (Eger Graben) of Central Europe, is characterized by the occurrence of an extensive coal seam near the base of the basin fill, overlain by tens to hundreds of metres of clastic strata, with a wide range of resulting compactional phenomena.

Our study focuses on a fluvial system in the eastern part of the so-called "Žatec Delta", the largest clastic depositional system of the Most Basin. Fluvial deposits exposed in the open-cast mine Hrabák (owned by MUS, a.s.) represent a relatively narrow, elongate body of clastics, lenticular in cross-section, enclosed within the main coal seam of the Most Basin.

Three main facies associations (architectural elements) occur in the studied part of this fluvial body and are interpreted as (i) channels and channel belts, (ii) lobes of splay deposits, (iii) sheets of floodplain deposits. Typically, the geometry of the architectural elements is dominated by syndepositional rotation of originally horizontal strata. This is interpreted as caused by localized differential subsidence induced by unequal compaction of underlying peat. With increasing compaction of peat loaded by fluvial clastics, the rate of subsidence at a particular location decreased and the locus of deposition migrated laterally toward the peripheries of the clastic system, where a potential of forming accommodation by compaction still existed. This gradual, outward shift of compaction-driven accommodation zones caused gradual lateral accretion of the whole depositional system, well-documented by the highwalls in the Hrabák mine, orientated oblique to almost perpendicular to palaeoflow.

At the scale of individual architectural elements, a typical effect of syndepositional tilting is the divergence of strata towards zones of higher rates of compactional subsidence, well-exemplified by sheet-like bodies of flood-plain fines and some packages of crevasse splay deposits. The patterns of migration of fluvial channels in time are a very sensitive indicator of spatial and temporal changes in local accommodation due to differential compaction. Three basic channel migration patterns were distinguished which differ in the ratio between the rates of deposition (V_d) and subsidence (V_s):

- 1) simple lateral migration - formation of a channel belt approximately parallel to surrounding strata, ($V_d \gg V_s$);
- 2) simple aggradation of channels, exposed as thick and narrow sandstone bodies in cross-section, ($V_d = V_s$);
- 3) oblique aggradation, a combination of lateral migration and aggradation during the channel activity, ($V_d > V_s$). Resulting channel-belts are oblique to general stratification.

During the lifetime of an individual channel system, its migration pattern could have changed several times as the channel migrated across places with different rates of compactional subsidence or in response to subsidence evolution of one place. Although geologically instantaneous avulsions of channels, interpreted as caused by floods, are also documented in the Hrabák mine, peat compaction was the main control of the channel migration patterns, as well as on the overall geometry of the whole depositional system.

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Effects of Tectonic- and Compaction-driven, Syndepositional Tilting in the Architecture of a Rift-margin Deltaic Complex: the Bílina Delta (Neogene), Most Basin, Czech Republic

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Although the changes in architecture of clastic strata are generally attributed to the interplay of sea/lake-level changes, subsidence, and sediment supply, there are many other factors which can exert a profound influence on stratigraphic geometries. The aim of our contribution is to highlight the roles of fault-propagation folding and compaction in tilting the basin floor at

the margin of an extensional basin and generating a wide range of responses in stratigraphic geometries of a lacustrine delta depositional system.

The Early Miocene Bílina Delta is a package of fluvio-deltaic clastics deposited at the southeastern margin of the Most Basin, one of the sub-basins of the Ohře Rift (Eger Gra-